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Case Report

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Creating smile aesthetics by using crown lengthening and upper lip repositioning surgical operations together in a gingival smile case: a case report

Canan Akdeniz, Arzum Güler Doğru

Department of Periodontology, Faculty of Dentistry, Dicle University, Diyarbakır, Turkey

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Corresponding Author: Canan Akdeniz, canan.akdeniz@dicle.edu.tr

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ABSTRACT

When the distance between the gingival margin and the lower border of the upper lip is more than 3 mm while smiling, it is called a gummy smile. The etiology of excessive gingival visibility is varied: delayed passive eruption, anterior dento-alveolar extrusion, vertical maxillary overhang, short upper lip, hypermobile upper lip, or a combination of multiple factors. The aim of our study is to diagnose gingival smile and explain the treatment of excessive gingival appearance due to vertical maxillary excess and hypermobile upper lip with crown lengthening and upper lip repositioning surgeries. A 27-year-old female patient presented to our clinic with the complaint of excessive gingival exposure while smiling. In the intraoral examination, it was determined that the patient had good oral hygiene, the upper lip was hypermobile, and the crown lengths of the upper central teeth were shorter than normal due to passive eruption. Gingivectomy, crown lengthening, and lip repositioning operations were planned for gummy smile treatment. For lip repositioning, the first incision was made from the mucogingival line of teeth numbered 14-24, the second incision was made 8-10 mm apically; and the tissue in between was excised. The wound edges were closed with 5.0 nylon mono sutures. Postoperative antibiotics, analgesics, and mouthwash were prescribed. The patient stated that he did not have any postoperative problems. The 6-month follow-up showed an uneventful recovery. In this case, the excessive gingival appearance was reduced by restricting the muscle traction of the elevator lip muscles, and the tooth length was increased with the crown length operation, providing aesthetic satisfaction for both the patient and the physician. As a result of our study, this procedure is safe for patients, less invasive, has minimal side effects, and may be an alternative to orthognathic surgery in appropriate cases for the correction of gingival smiles.

Keywords: Lip reposition, gummy smile, gingivectomy

This case was presented as a poster at the international Turkish Periodontology association in 2023.

INTRODUCTION

Smiling is a powerful communication method that expresses happiness and joy regardless of the language and race of the person. For this reason, it is a serious concern for individuals that their smile is not aesthetic. In order to have an aesthetic smile, all anatomical structures, such as the lips, gums, teeth, and jaws, must be in harmony.

Gummy smile, also known as "gummy smile" is defined as a non-pathologic condition in which more than 3 to 4 mm of gum tissue is visible when smiling, causing aesthetic disharmony. The etiology of a gummy smile includes short lip length, hypermobile/hyperactive lip activity, a short clinical crown, dentoalveolar extrusion, delayed passive eruption, impaired active eruption, vertical maxillary overhang, and gingival overgrowth.[1] The worldwide prevalence of gummy smiles ranges from 10.5% to 29% and is more common in women, with a ratio of 2:1.[2]

Before treating the gummy smile, the etiology should be accurately determined, and it should be kept in mind that more than one etiologic factor may coexist because the treatment of the gummy smile may vary according to the type and number of etiologic factors. Many different techniques have been used in the treatment of gingival smiles. Some of these methods are inserting maxillary teeth, crown lengthening, orthodontically leveling the gum margins of the upper teeth, lip repositioning surgery, orthognathic surgery, and non-surgical methods like botulinum toxin use.[3] In addition, hyaluronic acid (HA)-structured fillers have started to be used in the treatment of gummy smiles as a current therapeutic approach, with the idea that they increase the resistance of soft tissues and limit muscle movements.[4]

In 1973, the lip repositioning procedure to treat gingival smiles was described by Rubinstein and Kostianovsky, followed by case reports by Litton and Fournier, Miskinyar, and Robbins.[2] Shreyas et al.[5] found that a total of 105 articles on the subject were published in a 10-year literature review on the use of lip repositioning surgery in the treatment of gummy smiles. As can be seen, more studies on lip repositioning surgery are needed.

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The aim of this study is to describe the surgical technique of lip repositioning as an adjunct to crown lengthening in the following case report and to evaluate the 6-month efficacy of postoperative hypermobility of the upper lip.

CASE

A 27-year-old female patient was admitted to Dicle University Faculty of Dentistry, Periodontology Clinic, with the complaint of excessive gingival exposure while laughing (**Figure 1**).

Figure 1. Pre-operative spontaneous smile

Our patient stated that she covers her mouth with her hand while laughing in social environments. No obstacle to surgery was found in her medical history. No bone loss and clinical attachment loss were found in the intraoral and radiographic examinations, and no clinical inflammation was detected clinically (**Figure 2**).

Figure 2. Radiological data

According to the 2017 World Periodontology Workshop, she was classified as clinically gingival healthy in healthy periodontium. The clinical crown lengths of the anterior teeth of the maxilla were shorter than normal; the crown length of teeth 11 and 21 was measured at 8-8.5 mm (**Figure 3**). However, incisors, which are the center of the aesthetic smile, usually have crowns with a height of 9.5 to 11 mm.[6] The patient's smile arc was close to the ideal configuration; it was seen to be in the form of a convex arc. When the gingival levels were examined, it was determined that the gingival levels of the right and left lateral teeth were not symmetrical, and the gingival margin of the right canine tooth was below the right central tooth. According to the ideal red aesthetic criteria, the central gingival margin and the canine gingival margin should coincide, and the lateral gingival margin should be slightly below this line.[6]

Figure 3. Pre-operative maxillary central tooth length

When the patient's smile was evaluated, it was observed that the upper lip was thrown towards the base of the nose while laughing spontaneously, the gingiva appeared around 4 mm at this time, and the upper lip was hypermobile. After a detailed clinical examination, it was decided to perform crown lengthening and lip repositioning surgeries together. A gingivectomy was first performed to increase the visibility of the anterior teeth and to level the gingival margins (**Figure 4**).

Figure 4. After crown lengthening operation

Figure 5. Exposed connective tissue after incision

Lip repositioning surgery was performed to reduce the traction of the lip elevator muscles. Incision points were marked with a sterile surgical marking pen. The first incision was made horizontally from the mucogingival line of teeth

14-24. The second incision was made 6-8 mm apical to the first incision, with twice the amount of visible gingiva (**Figure 5**). After removing the tissue in between as half thickness, the connective tissue was exposed (**Figure 5**). The incision line on the lip side was dissected with blunt-tipped curved scissors to facilitate suturing. In order to ensure symmetry, first the midline, then the right and left most distal areas were joined with a simple suture, and then the remaining areas were sutured with a locked continuous suture (**Figure 6**).

The patient was prescribed antibiotics, analgesics, and mouthwash containing 0.12% chlorhexidine after surgery.

Figure 6. After suturation

RESULTS

An uneventful recovery was seen one week after surgery. The patient reported tension in her upper lip when she smiled 1 week after surgery. Two weeks later, the sutures were removed (**Figure 7**).

Figure 7. 2 weeks after the operation

Postoperative healing occurred with minimal discomfort. Since the suture line was hidden in the upper lip mucosa, uneventful healing was seen with a scar that was not visible when the patient smiled. Two weeks later, the patient's excessive gingival appearance was reduced (**Figure 8**). A stable result was obtained after 6 months of follow-up (**Figure 9**).

Figure 8. Spontaneous smile 2 weeks after the operation

Figure 9. Post-operative 6-month follow-up

DISCUSSION

This clinical report describes lip repositioning to reduce the appearance of excessive gingiva and crown lengthening surgery for aesthetic periodontal reasons. To achieve satisfactory results, the etiology must be accurately determined, and the lip repositioning procedure should be used alone or in combination in the right case. Contraindications to lip repositioning include the presence of a minimal area of adherent gingiva and severe vertical maxillary redundancy. A minimal area of adherent gingiva may pose difficulty in suturing, flap design, and stabilization.[7] According to the vertical maxillary excess classification, orthognathic surgery is preferred for grade II (excessive gingival appearance 4-8 mm) and grade III (excessive gingival appearance ≥ 8mm).[8] However, lip repositioning can be used as an alternative treatment for patients who do not want orthognathic surgery.[7]

The advantage of the lip repositioning technique over other gummy smile correction treatments is that it is simple, safe, and effective and provides stable and satisfactory treatment results after healing.[9]

Combining the lip repositioning technique with other approaches such as periodontal plastic surgeries, restorative procedures, or Botox injections has been suggested to achieve more predictable and consistent results.[10] Modifications of surgical lip repositioning have been reported in the medical literature. Several articles advocate

smile muscle disconnection to prevent the smile muscle from returning to its original position and to minimize flap tension during suturation. Another method to prevent reattachment of the smile muscles is to use an alloplastic or autogenous spacer. This spacer is inserted through the nose between the elevator muscles of the lip and the anterior nasal spina (ANS), restricting the upward movement of the lip. Lip repositioning has also been performed in combination with rhinoplasty. There are case reports of lip repositioning performed in combination with depigmentation and crown lengthening, frenectomy, and crown lengthening. There are also studies in the literature where crown lengthening and lip repositioning procedures were performed with lasers in the same session.[11]

In literature studies, the most common postoperative complications were reported as decreased comfort, scar formation, and pain. In modified lip repositioning surgeries, swelling, ecchymosis, edema in the upper lip and perioral region, minor bleeding, and mucocele formation were reported.[10]

CONCLUSION

This case report demonstrates the successful treatment of gingival smiles with lip repositioning and crown lengthening procedures. At 6-month follow-up, our results appear to be stable. Appropriate case selection is considered to be critical to the success of the surgical procedure. Long-term follow-up studies and randomized controlled trials are needed to evaluate the stability and efficacy of this method.

ETHICAL DECLARATIONS

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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